REMARKS/ARGUMENTS

In the Office Action mailed July 21, 2009, claim 1 was rejected. Additionally, claims 2-5 were objected to, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In response, Applicants hereby request reconsideration of the application in view of the amendments and the below-provided remarks. No claims are added or canceled.

For reference, claims 2 and 3 are amended. In particular, each of claims 2 and 3 is rewritten in independent form including all of the limitations of the base independent claim 1.

Allowable Subject Matter

Applicants appreciate the Examiner's review of the claims and determination that claims 2-5 recite allowable subject matter. In particular, the Office Action states that claims 2-5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. For reference, each of claims 2 and 3 is rewritten in independent form including all of the limitations of the base independent claim 1. Accordingly, Applicants submit that the resulting independent claims 2 and 3 are allowable. Also, claims 4 and 5 depend from independent claim 3 and are allowable.

Additionally, while the Office Action provides a statement of reasons for the indication of allowable subject matter, the statement is directed to specific aspects of certain claims and not necessarily all of the claims. Applicants note that the comments may have paraphrased the language of the claims and it should be understood that the language of the claims themselves set out the scope of the claims. Thus, it is noted that the claim language should be viewed in light of the exact language of the claim rather than any paraphrasing or implied limitations thereof.

Claim Rejections under 35 U.S.C. 103

Claim 1 was rejected under 35 U.S.C. 103(a) as being unpatentable over Hajimiri et al. (U.S. Pat. Pub. No. 2002/0173337, hereinafter Hajimiri) in view of Cheung (U.S.

Pat. No. 6,476,685, hereinafter Cheung) and Chappell (U.S. Pat. Pub. No. 2002/0141494, hereinafter Chappell) further in view of Cullum et al. (U.S. Pat. No. 6,058,258, hereinafter Cullum). However, Applicants respectfully submit that the claim is patentable over Hajimiri, Cheung, Chappell, and Cullum for the reasons provided below.

Independent Claim 1

Claim 1 is patentable over the combination of Hajimiri, Cheung, Chappell, and Cullum because the combination of cited references does not teach all of the limitations of the claim. Additionally, the Claim 1 recites:

> A tuning arrangement for receiving a plurality of signal channels and for tuning to a specific of said plurality of signal channels, the arrangement comprising:
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> a polyphase mixer for mixing said specific signal channel to an intermediate frequency which is lower than twice the bandwidth of the channel;
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> a polyphase IF filter for rejecting the negative frequencies in the mixer output signal; and
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> a polyphase group delay equalizer connected to the output of the polyphase IF filter;
>
> wherein the transfer function of the polyphase group delay equalizer has, for the frequency range of interest, one or more pole-zero pairs alongside of only the positive imaginary axis of the complex frequency plane with the pole(s) and the zero(s) of said one or more pairs lying substantially symmetrically with respect to said positive imaginary axis, wherein the one or more pole-zero pairs are shifted along the positive imaginary axis off of the real axis of the complex frequency plane.
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> (Emphasis added.)

In contrast, the combination of cited references does not teach all of the limitations of the claim. In particular, the combination of Hajimiri, Cheung, Chappell, and Cullum does not teach a polyphase group delay equalizer with a transfer function with one or more pole-zero pairs alongside of only the positive axis, and shifted along the positive imaginary axis off of the real axis, as recited in the claim.

For reference, the Office Action acknowledges that Hajimiri does not teach the indicated limitation, and the Office Action does not rely on Chappell as addressing the indicated limitation. Hence, the Office Action relies on Cheung as purportedly teaching a

transfer function with one or more pole-zero pairs alongside of only the positive imaginary axis of a complex frequency plane. Office Action, 7/21/09, page 4. The Office Action also relies on Cullum as purportedly teaching one or more pole zero pairs alongside of only the positive imaginary axis and shifted along the positive imaginary axis off of the real axis of the complex frequency plane. Office Action, 7/21/09, page 5.

However, the assertions in the Office Action regarding the purported teachings of Cheung and Cullum are inaccurate because Cheung does not teach pole-zero pairs alongside of only the positive imaginary axis and Cullum does not teach pole-zero pairs alongside of only the positive imaginary axis. Additionally, the proposed combination of references is improper at least because the referenced teachings of Cheung and Cullum are inconsistent and, hence, should not be combined. Consequently, the assertions in the Office Action are insufficient to establish a *prima facie* rejection.

1. The rejection is improper because Cheung and Cullum do not teach the asserted limitations.

As stated above, the Office Action asserts that Fig. 4a of Cheung purportedly teaches pole-zero pairs alongside of only the positive imaginary axis. However, Fig. 4a of Cheung merely teaches a pole-zero pair along the real axis, which is not located at either the positive or negative imaginary axis. Rather, the real axis is located at the zero point of the imaginary axis and, thus, is in between the positive and negative portions of the imaginary axis. Having a pole-zero pair at the real axis between the positive and negative portions of the imaginary axis should not be interpreted as being alongside of the positive imaginary axis because the real axis is not at the positive portion of the imaginary axis. In fact, the real axis is no closer to the positive portion of the imaginary axis than it is to the negative portion of the real axis. If it were considered acceptable to designate the real axis as being alongside of the positive imaginary axis, then it would also have to be acceptable to designate the real axis as being alongside of the negative imaginary axis. However, since the real axis cannot be adjacent to or alongside of both the positive and negative imaginary axes, the real axis should not be construed as being alongside of either the positive or the negative imaginary axes. Therefore, the teaching of a pole-zero pair along the real axis of Cheung should not be construed as a pole-zero pair

alongside of the positive imaginary axis, at least because the real axis is not alongside of the positive imaginary axis. Accordingly, Cheung does not teach the limitations of one or more pole-zero pairs alongside of only the positive imaginary axis of the complex frequency plane.

Similarly, Cullum does not teach the limitations referenced in the Office Action. As stated above, the Office Action asserts that Cullum purportedly teaches one or more pole zero pairs alongside of only the positive imaginary axis and shifted along the positive imaginary axis off of the real axis of the complex frequency plane. For reference, Cullum is generally directed to a system for creating linear circuit models for analyzing the stability and passivity of different physical systems. Cullum, col. 1, lines 6-10. In the embodiments referenced in the Office Action, Cullum describes using only the behavior of pole-zero pairs that are in a region in the upper half of the complex plane. Cullum, col. 10, lines 28-32. Presumably, the reference to the upper half of the complex plane is interpreted in the Office Action as the positive imaginary axis. Even if some of the models used in Cullum only consider the behavior of pole-zero pairs alongside the positive imaginary axis, Cullum nevertheless recognizes that the pole-zero pairs of the actual physical systems that are being modeled must occur in conjugate pairs. In other words, in the actual physical systems that are being modeled in Cullum, the pole-zero pairs alongside the positive imaginary axis must have conjugate pole-zero pairs alongside the negative imaginary axis. The fact that the models used in Cullum might ignore the behavior of the pole-zero pairs alongside the negative imaginary axis does not negate the fact that such pole-zero pairs alongside the negative imaginary axis must exist in the actual physical systems that are being modeled. Therefore, the teachings of using a model based on the behavior of pole-zero pairs alongside only the positive imaginary axis is insufficient to teach actual physical systems with pole-zero pairs alongside only the positive imaginary axis. Accordingly, Cullum does not teach the limitations of one or more pole-zero pairs alongside of only the positive imaginary axis of the complex frequency plane in an actual physical system such as a polyphase group delay equalizer.

2. The Office Action does not establish a *prima facie* case of obviousness because the reasoning in the Office Action relies on inconsistent teachings.

Moreover, even if the combination of cited references were to teach all of the limitations of the claim, the rejection of claim 1 nevertheless is improper because the Office Action does not establish a *prima facie* rejection for the claim. In order to establish a *prima facie* rejection of a claim under 35 U.S.C. 103, the Office Action must present a clear articulation of the reason why the claimed invention would have been obvious. MPEP 2142 (citing *KSR International Co. v. Teleflex Inc.*, 550 U.S. __ (2007)). The analysis must be made explicit. Id. Additionally, rejections based on obviousness cannot be sustained by mere conclusory statements; instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. Id.

In the rejection of claim 1, the reasoning in the Office Action attempts to combine the teachings of Fig. 4a of Cheung with the description in Cullum. As explained above, Fig. 4a of Cheung illustrates a pole-zero pair that is located directly on the real axis, so the pole-zero pair is not shifted in the positive direction of the imaginary axis. In other words, the pole-zero pair of Fig. 4a is not alongside the imaginary axis. In contrast, the referenced teachings of Cullum relate to implementing a model using only the behavior of pole-zero pairs in the positive half of the imaginary plane, even though Callum indicates that the modeled physical systems must occur in conjugate pairs.

Even if it were possible to otherwise combine the teachings of Cheung and Cullum, the locations of the pole-zero pairs in Cheung and Cullum are different and not suitable for combination with each other. Specifically, combining the pole-zero pair on the real axis of Cheung with the modeling system of Cullum would result in a model without any behavior in the region in the upper half of the complex plane, because Fig. 4a of Cheung does not include any pole-zero pairs in the upper half of the complex plane. Conversely, combining pole-zero pairs in the upper half of the complex plane, as described in Cullum, with the pole-zero pair on the real axis of Cheung would result in pole-zero pairs located both in the upper half of the complex plane as well as on the real axis. Hence, the resulting combination of pole-zero pairs would not be located only alongside the positive axis. Moreover, Cullum recognizes that the pole-zero pairs in the

upper half of the complex plan must have conjugate pairs in the lower half of the complex plane, so the proposed combination of Cheung and Cullum would further result in pole-zero pairs in the lower half of the complex plane. Consequently, the presence of pole-zero pairs in the lower half of the complex plane would not qualify as having pole-zero pairs alongside only the positive imaginary axis. Therefore, the inconsistent teachings of pole-zero pairs on the real axis and in the upper half (and corresponding lower half) of the complex plane cannot be combined, despite the assertions in the Office Action, to achieve a transfer function of a polyphase group delay equalizer which as has one or more pole-zero pairs alongside of only the positive imaginary axis of the complex frequency plane.

For the reasons presented above, the attempt to combine the inconsistent teachings of Cheung and Cullum is improper because the combination of pole-zero pairs on the real axis and in the upper and lower halves of the complex plane does not address the actual limitations of the claim, namely one or more pole-zero pairs alongside of only the positive imaginary axis of the complex frequency plane. Since the reasoning in the Office Action relies on inconsistent teachings, the reasoning asserted in the Office Action is improper and, hence, fails to support a *prima facie* rejection for claim 1. Accordingly, Applicants respectfully submit that the rejection of claim 1 under 35 U.S.C. 103(a) should be withdrawn because the Office Action fails to establish a *prima facie* rejection.

CONCLUSION

Applicants respectfully request reconsideration of the claims in view of the amendments and the remarks made herein. A notice of allowance is earnestly solicited.

At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account **50-4019** pursuant to 37 C.F.R. 1.25. Additionally, please charge any fees to Deposit Account **50-4019** under 37 C.F.R. 1.16, 1.17, 1.19, 1.20 and 1.21.

Respectfully submitted,

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